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The effects of eye cosmetics on the ocular physiology of hard contact lens wearers

Abstract

Fifteen successful hard contact lens wearers applied mascara and eyeshadow to their eyes for eight days. Two out of the three following types of cosmetics were worn in succession : hypo-allergenic, water soluble and non-water soluble. Objective evaluations included: (1) changes in the tear film, (2) inflammatory responses of the conjunctiva and lids, and (3) amount of deposits on the lenses. Subjective evaluations included: (1) easability of cleaning of the lens, (2) degree of itching and irritation, (3) degree of overall comfort when wearing contact lenses and eye cosmetics. Evaluations were conducted on the fourth and eighth day of cosmetic wear. While certain individuals experienced problems with cosmetics and contact lenses, there was no significant difference between the specific types of cosmetics in the rate or severity of problems encountered.

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THE EFFECTS OF EYE COSMETICS ON THE OCULAR
PHYSIOLOGY OF HARD CONTACT LENS WEARERS

Nancy Jones

Amy Postma

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January 30, 1980

TABLE OF CONTENTS

	<u>Page</u>
Acknowledgements	i
Abstract	ii
Introduction	1
Methods	3
Subject Selection	3
Materials	3
Procedures	4
Results	11
Discussion	25
Tables: 1 - Ocular Evaluations of Hard Contact Lens Wearers Before Application of Eye Cosmetics	11
2 - Ocular Evaluation of Hard Contact Lens Wearers During Eye Cosmetic Wear	13
3 - Subject Responses of Hard Contact Lens Wearers During Eye Cosmetic Wear	17
4 - Analysis of Subjective Symptoms of Contact Lens Wearers During Eye Cosmetic Wear	23
5 - Analysis of Objective Signs of Contact Lens Wearers During Eye Cosmetic Wear	24
Figures: 1 - Scale for the Number of Particles in the Tear Film	4
2 - Scale for Condition of Palpebral Conjunctiva . . .	5
3 - Scale for Degree of Bulbar Conjunctiva Injection ..	5
4 - Scale for Degree of Lid Inflammation	5
5 - Scale for Amount of Deposits on Lens	6
6 - Scale for Degree of Itching	7
7 - Scale for Degree of Irritation	7
8 - Scale for Degree of Tearing	8
9 - Scale for Degree of Burning	8
10 - Scale for Amount of Discomfort	9

Figures (cont'd)	<u>Page</u>
11 - Scale for Easibility of Cleaning	9
12 - Scale for Degree of Overall Comfort	10
13 - Particles in the Tear Film Seen at the Morning Observation	16
14 - Mascara Deposit on Lens Seen at the Morning Observation	21
15 - Mascara Deposit Still Apparent on Lens After Cleaning and Eight Hours of Wear	22
References	28
Appendix A - Human Subject Release Form	29
Appendix B - Letter on Optique Cosmetics	30
Appendix C - Ingredients List	34

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Nancy Jones

Amy Postma

ABSTRACT

Fifteen successful hard contact lens wearers applied mascara and eyeshadow to their eyes for eight days. Two out of the three following types of cosmetics were worn in succession: hypo-allergenic, water soluble and non-water soluble. Objective evaluations included: (1) changes in the tear film, (2) inflammatory responses of the conjunctiva and lids, and (3) amount of deposits on the lenses. Subjective evaluations included: (1) easability of cleaning of the lens, (2) degree of itching and irritation, (3) degree of overall comfort when wearing contact lenses and eye cosmetics. Evaluations were conducted on the fourth and eighth day of cosmetic wear. While certain individuals experienced problems with cosmetics and contact lenses, there was no significant difference between the specific types of cosmetics in the rate or severity of problems encountered.

INTRODUCTION

Women who wear cosmetics are often not given advice by optometrists concerning possible ocular problems that may occur due to the cosmetics. Ocular physiology may be changed by the cosmetics giving rise to such problems as ocular irritation, itching, burning and excessive tearing. Cosmetics may get contaminated with bacteria, especially Pseudomonas auregnosa^{1,2,3,4} that then can cause ocular infections.

Contact lens wear may also affect ocular physiology. Parameters that may be changed with contact lens wear include tear flow, number of particles in tear film, degree of corneal hydration⁵ and an increase of potential risk to corneal infections.^{6,7}

Wearing eye cosmetics may add another dimension to contact lens wear, thereby compounding problems more than if either is worn alone. Various practitioners have expressed concern about cosmetics and their interference with contact lens wear. They have reported problems such as deposits on lenses, itching and irritation, swollen eye lids, red eyes and particles of cosmetic in the eye and tear film.⁸

Several cases have been seen in our clinic in which cosmetics interfered with contact lens wear. One patient was bothered by itching, burning and dry eyes. When she was instructed to discontinue use of eye cosmetics for two days, the symptoms disappeared. Another patient had symptoms of tearing and itching. She switched brands of cosmetics

and the symptoms were relieved. One patient complained that when she wore her lenses she became very uncomfortable because of her eyes. Her eyes were red. Upon biomicroscope evaluation it was seen that the break-up time of the tear film had changed. Total discontinuation of the contact lenses and cosmetics was suggested and after this was done, the symptoms disappeared.

Because of potential problems, it is important that information be given to contact lens wearers about cosmetic use. Lack of advice is due to two factors: the lack of research in this area and the optometrist's lack of personal experience with cosmetics. Because little published research has been done in this area, we decided to study the short term effects of wearing mascara and eyeshadow, particularly water soluble, non-water soluble and hypo-allergenic types on ocular physiology in contact lens wearers. We specifically measured: (1) the number of particles per mm area in the tear film, (2) condition of the conjunctiva of the everted lid, (3) degree of bulbar injection, (4) degree of lid inflammation, and (5) amount of deposits on the contact lens. The subjects were asked to rate: (1) degree of itching, (2) degree of irritation, (3) degree of tearing, (4) degree of burning, (5) amount of discomfort, (6) easability in cleaning, and (7) degree of overall comfort while wearing mascara and eyeshadow with contact lenses. Subjective symptoms were then compared to objective signs.

METHODS

Subject Selection

Fifteen virgin cosmetic wearers, specifically male subjects, who were successful hard contact lens wearers were selected to participate in this study. Our successful wearers had attained 12-17 hours of daily wear, had no or minimum amounts of giant papillary conjunctivitis, no or minimum deposits on their lenses, and had minimum injection. Release forms for each subject were obtained prior to actual experimentation. (Example - Appendix A).

Materials

Three major types of eye cosmetics: water soluble (Maybel-line), non-water soluble (Mary Kay), and hypo-allergenic (Clinique) were selected and labeled type A, B and C respectively. A new line of cosmetics, Optique, has been developed in England specifically for women who wear contact lenses.⁹ Attempts to include this product in this project were unsuccessful as it is available only in England. (See Appendix B) Specific ingredients of each cosmetic type are listed in Appendix C. No attempt was made to disguise the types of make-up as all subjects were male and had no experience with such products.

Procedures

One to five days before application of make-up, two photographs were taken, once in the morning and once eight hours later, of the lids, tear film and any obvious peculiarities of each individual's eyes. Photographs of the tear film and adnexia were taken with a Nikon Camera 10x adapter system. Lid eversion pictures were taken with a Pentax Macro-system. 400 ASA film was used for taking all photographs.

Slit lamp evaluations were also made one to five days before application of make-up using seven point scales to rate: (1) the number of particles in the tear film, (2) the condition of the palpebral conjunctiva, (3) the degree of bulbar injection, (4) the degree of lid inflammation, and (5) the amount of deposits on lenses. Rating scales are listed in Figures 1, 2, 3, 4 and 5.

Figure 1

SCALE FOR THE NUMBER OF PARTICLES IN THE TEAR FILM

Scale Number	Description
1	No particles
2	Min. # of particles, 3/2 mm area
3	Small # of particles
4	Med. # of particles, 6/2 mm area
5	Med. # of particles, debris
6	Large # of particles, 10/2 mm area
7	Heavy exudates, particles and debris

Figure 2

SCALE FOR CONDITION OF PALPEBRAL CONJUNCTIVA

Scale Number	Description
1	No papillae, no injection, pale yellow-pink
2	Slight inj., no papillae
3	Mod. inj., no papillae
4	Mod. inj. pink, small papillae less than .5mm
5	Mod. inj., papillae .5mm
6	Mod. inj. papillae 1mm
7	Heavy inj. deep red, papillae 1mm

Figure 3

SCALE FOR DEGREE OF BULBAR CONJUNCTIVA INJECTION

Scale Number	Description
1	No injection
2	Slight injection, 3 major branches evident
3	Min. injection
4	Mod. injection, 6 major branches evident
5	Mod. large injection
6	Large injection, 9 major branches evident
7	Highly inflamed, swollen

Figure 4

SCALE FOR DEGREE OF LID INFLAMMATION

Scale Number	Description
1	No inflammation, no puffiness
2	Slightly inflamed, slightly puffy
3	Min. inflamed, min. puffiness
4	Mod. inflamed, mod. puffy
5	Mod. large inflamed, mod. large puffiness
6	Largely inflamed, slightly swollen
7	Highly inflamed, swollen

Figure 5
SCALE FOR AMOUNT OF DEPOSITS ON LENS

Scale Number	Description
1	No deposits
2	Slight deposits, 2 minute specs
3	Min. deposits
4	Mod. deposits, cover 1 mm area, mucous min. scratches (3)
5	Mod. deposits, mod. mucous, mod # of scratches
6	Dense mucous and deposits, cover 3 mm area, mod. # of scratches
7	Heavy mucous and deposit build-up, heavy scratching

Five subjects wore Maybelline and Mary Kay, five wore Mary Kay and Clinique, and five wore Clinique and Maybelline. The subjects were asked to apply the first cosmetic type to the right eye once daily for four days, maintaining the left eye for the control. The same cosmetic was then worn on the left eye for the next four days, with the right eye as the control. A five-day rest period between cosmetics was instituted where no cosmetic was worn. This same procedure was then followed for the second type of cosmetic.

At the end of each fourth day of cosmetic wear, a slit lamp evaluation was done again using the rating scales in Figures 1, 2, 3, 4 and 5. The results from the pre-cosmetic slit lamp evaluation were compared to the results from the slit lamp evaluation done during cosmetic wear to determine if the cosmetics themselves changed any of the measured parameters above the baseline values.

Subjects were asked, at the end of the fourth and eighth days, to rate: (1) degree of itching, (2) degree of irritation, (3) degree of tearing, (4) degree of burning, (5) amount of discomfort, (6) easability of cleaning, and (7) degree of overall comfort using the rating scales in Figures 6, 7, 8, 9, 10, 11 and 12.

Figure 6
SCALE FOR DEGREE OF ITCHING

Scale Number	Description
1	No itching
2	Slight itching noted
3	Min. itching noted
4	Mod. itching noted several times a day
5	Mod. large amounts of itching noted
6	Large amounts of itching noted
7	Severe itching, rubbing eyes constantly

Figure 7
SCALE FOR DEGREE OF IRRITATION

Scale Number	Description
1	No irritation noted
2	Slight irritation noted
3	Min. irritation noted
4	Mod. irritation, scratchy sensation several times a day
5	Mod. large amounts of irritation
6	Large amounts of irritation
7	Severe irritation, can't keep contacts in, removal

Figure 8
SCALE FOR DEGREE OF TEARING

Scale Number	Description
1	No tearing
2	Slight tearing
3	Minimum tearing
4	Mod. tearing, need to wipe eyes several times a day
5	Mod. large amounts of tearing
6	Large amounts of tearing
7	Severe tearing, tears constantly running down cheeks

Figure 9
SCALE FOR DEGREE OF BURNING

Scale Number	Description
1	No burning
2	Slight burning
3	Min. burning
4	Mod. burning, eyes feel hot several times a day
5	Mod. large amounts of burning
6	Large amounts of burning
7	Severe burning, need to remove lens several times a day

Figure 10
SCALE FOR AMOUNT OF DISCOMFORT

Scale Number	Description
1	No discomfort
2	Slight discomfort
3	Min. discomfort
4	Mod. discomfort, removes lens once a day for relief
5	Mod. large amounts of discomfort
6	Large amounts of discomfort
7	Severe discomfort, cannot wear contact lens

Figure 11
SCALE FOR EASABILITY OF CLEANING

Scale Number	Description
1	No change noted
2	Slight change noted
3	Min. change noted
4	Mod. amounts of rubbing to get CL clean, more than usual
5	Heavy rubbing needed
6	Heavy rubbing needed, polish needed
7	Cannot remove by normal means

Figure 12
SCALE FOR DEGREE OF OVERALL COMFORT

Scale Number	Description
1	Excellent, no problems
2	Good, slight problem
3	Good, min. problem
4	Fair, mod. problem, some itching, irritation etc.
5	Fair, mod. large number of problems
6	Poor, large number of problems
7	Poor, made wearing of contact lens intolerable

A summary of the results of each sign and symptom for each cosmetic was compiled showing means, medians and ranges so that the responses to each cosmetic by each individual could be compared to the other types of cosmetics.

RESULTS

The assessment of the hard contact lens wearers before application of any eye cosmetics was made using the following objective signs: the number of particles per mm in the tear film, the conjunctival injection, the degree of inflammatory response of the lid, and the amount of deposits on the lenses. The results are shown in Table 1, sections A - E.

TABLE 1

OCULAR EVALUATIONS OF HARD CONTACT LENS WEARERS BEFORE APPLICATION OF EYE COSMETICS

Section A - Number of Particles per mm in the Tear Film			Section B - Condition of the Palpebral Conjunctiva		
Subject	O.D.	O.S.	Subject	O.D.	O.S.
1	2	2	1	2	2
2	2	2	2	2	2
3	2	2	3	3	3
4	2	2	4	2	2
5	2	2	5	2	2
6	2	2	6	2	2
7	2	2	7	3	3
8	2	2	8	2	2
9	2	2	9	2	2
10	2	2	10	2	2
11	2	2	11	2	2
12	2	2	12	2	2
13	3	3	13	2	2
14	2	2	14	2	2
15	2	2	15	2	2

TABLE 1 (cont'd)

Section C - Degree of Bulbar Conjunctival Injection			Section D - Degree of Inflam- matory response of the Lid		
Subject	O.D.	O.S.	Subject	O.D.	O.S.
1	2	2	1	3	3
2	3	3	2	3	3
3	3	3	3	4	4
4	2	2	4	2	2
5	2	2	5	2	2
6	3	3	6	2	2
7	3	3	7	2	2
8	3	3	8	2	2
9	3	3	9	2	2
10	2	2	10	2	2
11	2	2	11	3	3
12	2	2	12	2	2
13	3	3	13	2	2
14	2	2	14	2	2
15	2	2	15	2	2

Section E - Amount of Deposits on Lenses		
Subject	O.D.	O.S.
1	2	2
2	3	3
3	3	3
4	2	2
5	2	2
6	3	3
7	3	3
8	2	2
9	3	3
10	2	2
11	2	2
12	2	2
13	3	3
14	2	2
15	2	2

Using the same objective signs as in Table 1, the ocular response to cosmetic wear was evaluated. Results are shown in Table 2, Sections A - E.

TABLE 2

OCULAR EVALUATION OF HARD CONTACT LENS WEARERS
DURING EYE COSMETIC WEAR

Section A - Number of Particles per mm in the Tear Film												
O.D.						O.S.						
Subject	Cos. A		Cos. B		Cos. C		Cos. A		Cos. B.		Cos. C	
	Am	Pm	Am	Pm	Am	Pm	Am	Pm	Am	Pm	Am	Pm
1			2	2	2	2			2	2	2	2
2			2	2	4	2			2	2	4	3
3			2	2	4	2			2	2	4	
4			2	2	3	2			4	2	3	2
5	2	2	3				2		3			
6	4	4	3				4		3			
7	2	2	2	2			2	2	2	2		
8	4	3			4	3	4	4			4	3
9			3	3					3	3	5	2
10	5				2		2				2	
11	4				3	4	3				3	4
12					2						3	
13	4				2						2	2
14	5	3	2	2			2]	2	2		
15	2	2	2	2			3	3	2	1		

TABLE 2 (cont'd)

Section B - Condition of the Palpebral Conjunctiva												
O.D.							O.S.					
Subject	Cos. A		Cos. B		Cos. C		Cos. A		Cos. B		Cos. C	
	Am	Pm	Am	Pm	Am	Pm	Am	Pm	Am	Pm	Am	Pm
1			2	2	2	2			2	2	2	2
2			2	2	3	3			2	2	3	3
3			2	4	3	3			2	2	3	
4			3	2	2	2			3	2	2	2
5	3	2	2				4		2			
6	3	2	2				2		2			
7	3	3	3	3			3	3	3	3		
8	4	2			3	2	2	4			3	2
9			3	3					3	3	3	3
10	3				3		2				3	
11	2				3		2				3	2
12					3						3	
13	2				2						2	3
14	3	3	2	2			2	2	2	2		
15	2	2	2	2			3	3	2	1		

Section C - Degree of Bulbar Conjunctival Injection												
O.D.							O.S.					
Subject	Cos. A		Cos. B		Cos. C		Cos. A		Cos. B		Cos. C	
	Am	Pm	Am	Pm	Am	Pm	Am	Pm	Am	Pm	Am	Pm
1			2	2	2	2			2	2	2	2
2			3	2	3	2			2	3	3	2
3			2	2	4	3			2	2	3	
4			2	2	2	2			2	2	2	2
5	2	2	2				2		2			
6	2	2	2				2		2			
7	3	3	3	3			3	3	3	3		
8	3	5			2	2	3	5			2	2
9			2	2					2	2	3	3
10	3				2		3				3	
11	2				2		2				2	2
12					2						3	
13	2				2						2	2
14	3	3	3	3			2	2	2	2		
15	2	2	2	2			3	3	2	2		

TABLE 2 (cont'd)

Section D - Degree of Inflammatory Response of the Lid												
O.D.							O.S.					
Subject	Cos. A		Cos. B		Cos. C		Cos. A		Cos. B		Cos. C	
	Am	Pm	Am	Pm	Am	Pm	Am	Pm	Am	Pm	Am	Pm
1			2	2	3	2			2	2	2	3
2			3	3	3	2			3	3	3	3
3			2	3	2	2			2	3	2	
4			2	2	2	2			2	2	2	2
5	2	2	2				2		2			
6	2	2	2				2		2			
7	2	2	2	2			2	2	2	2		
8	2	3			2	2	2	3			2	2
9			2	2					2	2	3	3
10	3				2		3				2	
11	2				2		2				2	2
12					2						2	
13	2				2						2	3
14	3	3	2	2			2	2	2	2		
15	3	3	2	2			3	3	2	2		

Section E - Amount of Deposits on Lenses												
O.D.							O.S.					
Subject	Cos. A		Cos. B		Cos. C		Cos. A		Cos. B		Cos. C	
	Am	Pm	Am	Pm	Am	Pm	Am	Pm	Am	Pm	Am	Pm
1			2	2	2	3			2	2	2	2
2			2	2	5	3			2	2	4	3
3			2	2	4	4			2	4	4	
4			2	2	3	2			2	2	3	2
5	2	3	2				2		2			
6	2	2	4				2		4			
7	4	3	3	3			3	3	3	3		
8	4	3			3	2	4	5			3	3
9			5	5					5	5	5	3
10	6				2		3				3	
11	3				3		2				3	2
12					2						2	
13	4				4						4	3
14	5	4	2	2			3	3	2	2		
15	3	3	2	2			6	3	3	2		

Comparison of the objective signs from each individual before cosmetic application and during cosmetic wear shows that the conjunctiva and lids do not change measurably in response to the cosmetics. However, the number of particles in the tear film increased in most subjects. (See Subjects 2, 3, 4, 6, 8, 9, 10, 11, 13, 14, 15 in Section A, Tables 1 and 2) (See Figure 13)



Figure 13

Particles in the Tear Film Seen at the
Morning Observation.

and also the number of lens deposits increased in some subjects.

(See Subjects 2, 3, 8, 9, 10 and 15).

The subjects ratings of the symptoms: degree of itching, degree of irritation, degree of tearing, degree of burning, amount of discomfort and easability of cleaning of the lenses when wearing both cosmetics and contact lenses are shown in Table 3, Sections A - G.

TABLE 3

SUBJECT RESPONSES OF HARD CONTACT LENS WEARERS
DURING EYE COSMETIC WEAR

Section A - Degree of Itching						
Subject	Cos. A		Cos. B		Cos. C	
	OD	OS	OD	OS	OD	OS
1			1	1	2	3
2			1	1	1	1
3			2	2	1	1
4			1	2	1	1
5	1	2	1	1		
6	2	2	2	1		
7	1	1	1	1		
8	1	1			1	1
9			2	3	1	3
10	2	1			1	
11	1	1			1	1
12	1	1			1	1
13	1	1			1	1
14	1	4	1	1		
15	1	1	1	1		

TABLE 3 (cont'd)

Section B - Degree of Irritation						
Subject	Cos. A		Cos. B		Cos. C	
	OD	OS	OD	OS	OD	OS
1			1	2	1	2
2			1	1	1	1
3			2	3	1	2
4			5	1	2	3
5	1	2	1	1		
6	3	3	2	1		
7	1	1	1	1		
8	2	2			1	1
9			4	4	2	4
10	2	1			2	
11	1	1			1	1
12	2	2			2	2
13	2	2			1	1
14	3	4	3	1		
15	1	1	3	1		

Section C - Degree of Tearing						
Subject	Cos. A		Cos. B		Cos. C	
	OD	OS	OD	OS	OD	OS
1			2	1	1	1
2			1	1	1	1
3			2	1	1	1
4			1	1	1	1
5	1	1	1	1		
6	1	1	1	1		
7	1	1	1	1		
8	1	1			1	1
9			1	1	1	1
10	1	1			1	
11	1	1			1	1
12	1	1			1	1
13	1	1			1	1
14	1	1	2	1		
15	3	4	3	2		

TABLE 3 (cont'd)

Section D - Degree of Burning						
Subject	Cos. A		Cos. B		Cos. C	
	OD	OS	OD	OS	OD	OS
1			1	2	3	1
2			1	1	1	1
3			1	1	1	1
4			1	1	1	1
5	1	1	1	1		
6	1	1	1	1		
7	1	1	1	1		
8	1	1			1	1
9			1	1	1	2
10	2	1			1	
11	1	1			1	1
12	1	1			1	1
13	1	1			1	1
14	3	4	2	1		
15	1	1	1	1		

Section E - Degree of Discomfort						
Subject	Cos. A		Cos. B		Cos. C	
	OD	OS	OD	OS	OD	OS
1			1	1	2	1
2			1	1	1	1
3			3	2	1	2
4			5	1	4	4
5	1	2	1	1		
6	3	3	2	2		
7	1	1	1	1		
8	2	2			1	1
9			4	5	2	4
10	2	1			1	
11	1	1			3	3
12	2	2			2	2
13	2	2			2	2
14	3	4	3	2		
15	2	3	3	2		

TABLE 3 (cont'd)

Section F - Easibility of Cleaning						
Subject	Cos. A		Cos. B		Cos. C	
	OD	OS	OD	OS	OD	OS
1			1	1	3	2
2			1	1	1	1
3			4	1	1	2
4			1	1	3	3
5	2	3	1	2		
6	3	3	1	1		
7	1	1	1	1		
8	1	1			1	1
9			1	1	2	4
10	2	1			1	
11	1	1			1	1
12	1	1			1	1
13	3	2			2	2
14	1	1	1	1		
15	1	1	1	1		

Section G - Degree of Overall Comfort						
Subject	Cos. A		Cos. B		Cos. C	
	OD	OS	OD	OS	OD	OS
1			1	1	3	2
2			1	1	1	1
3			4	3	1	2
4			3	2	4	4
5	1	2	1	1		
6	4	4	2	2		
7	1	1	1	1		
8	2	2			1	1
9			4	4	4	5
10	1	1			1	
11	1	1			1	1
12	2	2			2	2
13	2	2			2	2
14	4	6	2	2		
15	2	3	2	1		

Many of the subjects responded to cosmetic wear by a change in overall comfort. (See Subjects 3, 4, 6, 9, 12, 13, 14 and 15 in Section G, Table 3). More specifically, some subjects expressed the discomfort as an increase in itching (see Subjects 3, 6, 9 in Section A, Table 3), as an increase in irritation (see Subjects 4, 9 and 14 in Section B, Table 3), as an increase in tearing (see Subject 15 in Section C, Table 3), and as an increase in burning (see Subject 14 in Section D, Table 3). With some subjects routine lens cleaning was not sufficient to remove cosmetic debris from the contact lens (see Subjects 4, 5 and 9 in Section F, Table 3). (See Figures 14 and 15).

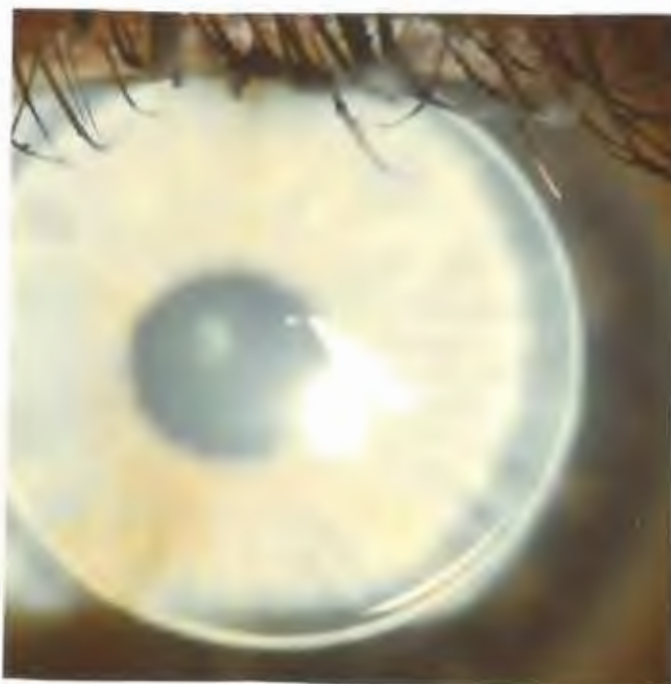


Figure 14

Mascara Deposit on Lens Seen at the Morning Observation
Directly After Application of Make-Up.



Figure 15

Mascara Deposit Still Apparent on Lens After
Cleaning and Eight Hours of Wear.
(Same Subject as Figure 14)

Even though some individuals experienced problems while wearing cosmetics with contact lenses, the results from analysis of the subjective symptoms and objective signs showed that there is no difference between the three brands of cosmetics used in the rate or severity of problems encountered. (See Tables 4 and 5).

TABLE 4

ANALYSIS OF SUBJECTIVE SYMPTOMS OF CONTACT LENS
WEARERS DURING EYE COSMETIC WEAR

Symptom	Cosmetic A		Cosmetic B		Cosmetic C	
	OD	OS	OD	OS	OD	OS
Itching						
Range	1-2	1-4	1-2	1-2	1-2	1-3
Median	1	2	1	1	1	2
Mean	1.2	1.5	1.3	1.4	1.1	1.5
Irritation						
Range	1-3	1-4	1-5	1-4	1-2	1-4
Median	2	2	3	2	1	2
Mean	1.8	1.9	2.3	1.6	1.4	2
Tearing						
Range	1-3	1-4	1-3	1-2	1-1	1-1
Median	2	2	2	1	1	1
Mean	1.2	1.3	1.5	1.1	1	1
Burning						
Range	1-3	1-4	1-2	1-2	1-3	1-2
Median	2	2	1	1	2	1
Mean	1.3	1.3	1.1	1.1	1.2	1.1
Discomfort						
Range	1-3	1-4	1-5	1-5	1-4	1-4
Median	2	2	3	3	2	2
Mean	1.9	2.1	2.4	1.8	1.9	2.3
Cleaning						
Range	1-3	1-3	1-4	1-2	1-3	1-4
Median	2	2	2	1	2	2
Mean	1.5	1.5	1.3	1.1	1.6	1.9
Overall Comfort						
Range	1-4	1-6	1-4	1-4	1-4	1-5
Median	2	3	2	2	2	3
Mean	2	2.4	2.1	1.8	2	2.3

The analysis for each symptom uses a total of ten evaluations for all cosmetic types.

TABLE 5

ANALYSIS OF OBJECTIVE SIGNS OF CONTACT LENS WEARERS
DURING EYE COSMETIC WEAR

Right Eye Only						
Sign	Cosmetic A		Cosmetic B		Cosmetic C	
	Am	Pm	Am	Pm	Am	Pm
# of Part. in Tear						
Range	2-5	2-4	2-3	2-3	2-4	2-3
Median	3	3	2	2	3	2
Mean	3.6	2.7	2.3	2.1	2.9	2.2
Cond. of Palp. Conj.						
Range	2-4	2-3	2-3	2-4	2-3	2-3
Median	3	2	2	3	2	2
Mean	2.8	2.3	2.3	2.5	2.7	2.4
Bulbar Conj. Inj.						
Range	2-3	2-5	2-3	2-3	2-3	2-3
Median	2	3	2	2	2	2
Mean	2.4	2.8	2.2	2.1	2.3	2.2
Infl. Resp. of Lid.						
Range	2-3	2-3	2-3	2-3	2-3	2-2
Median	2	2	2	2	2	2
Mean	2.3	2.5	2.1	2.3	2.2	2.0
Deposits on Lens						
Range	2-6	2-4	2-5	2-5	2-5	2-4
Median	4	3	3	3	3	3
Mean	3.7	3	2.6	2.6	3.1	3.8
Left Eye Only						
# of Part. in Tear						
Range	2-4	1-4	2.4	1.3	2.5	2.4
Median	3	2	3	2	4	3
Mean	2.8	2.5	2.5	2	3.2	2.6
Cond. of Palp. Conj.						
Range	2-4	2-4	2-3	1.3	2-3	2-3
Median	3	3	2	2	2	2
Mean	2.6	3	2.3	2.1	2.7	2.4
Bulbar Conj. Inj.						
Range	2-3	2-5	2-3	2-3	2-3	2-3
Median	2	3	2	2	2	2
Mean	2.5	3.3	2.1	2.3	2.5	2.1
Infl. Resp. of Lid						
Range	2-3	2-3	2-3	2-3	2-3	2-3
Median	2	2	2	2	2	2
Mean	2.3	2.5	2.1	2.3	2.2	2.6
Cosmetic Deposits on Lenses						
Range	2-4	2-6	2-5	2-5	2-5	2-3
Median	3	4	3	3	3	2
Mean	3.1	3.5	2.7	2.8	3.3	2.6

The analysis for each sign uses a total of nine evaluations for cosmetic types A and C, and ten evaluations for cosmetic type B.

DISCUSSION

The results from our study showed no significant difference between the three types of cosmetics in terms of subjective symptoms and objective signs. However, individual reactions to cosmetics varied. Based on both subjective and objective reactions to the cosmetics, the subjects fell into three categories: the non-sensitive, (e.g. subject #1), the super-sensitive, (e.g. Subjects #4 and 9), and the mildly sensitive. This is analogous to how individuals react to cosmetics, the range is from sensitive to non-sensitive.¹⁰ The non-sensitive wearers had no change in routine wear or cleaning. Those who were super-sensitive and mildly sensitive reacted more adversely to the cosmetics. The sensitive subjects encountered problems of irritation, tearing, burning and itching when wearing contact lenses with cosmetics and in difficulty with routine cleaning of cosmetic particles off the contact lenses. Regardless of what is seen or not seen, the practitioner must consider the patient as an individual and not generalize by the brand of cosmetic.

Many subject responses correlated with objective signs. However, for some subjects the objective signs and subjective symptoms did not always correlate. For example, several instances were found where numerous particles were seen in the tear film and the subject did not complain of symptoms. (Tables 1,2: Subjects # 8, 10 and 11). Thus the practitioner must investigate both subject's complaints and objective signs to determine if cosmetics are influencing ocular physiology.

In order for practitioners to understand problems associated with cosmetic wear and to give advice on cosmetics use, several important points suggested by C.W. Bruch¹¹ were reaffirmed by this study. Cosmetics must be applied with care and effort. Sufficient time should be given for the task so as to avoid getting the cosmetics in the eye. Always counsel hard lens wearers that make-up should be applied after lens insertion so as to avoid contaminating the lens surface. Remove cosmetics each night very gently after removing lens. It is also imperative that lenses are thoroughly cleaned before storage, to avoid build-up of cosmetic particles along with other tear components and further problems may be averted. Eye shadow, applied from the upper lash margin to the eye brow line, can be found in liquid or powder form in non-water soluble, water soluble and hypo-allergenic types of cosmetics. Powder eye shadow seems to be more susceptible to falling in the eye and getting trapped in the tear film and thus clinging to the lenses.

Mascara, applied to the upper and lower lashes, is also found in non-water soluble, water soluble and hypo-allergenic types of cosmetics. The more heavily it is applied the more problems and symptoms are encountered.

Eyeliner has not been researched in this project, but it may also pose a problem as it is applied to the outer and inner margins of the lid.

When a practitioner believes contact lens problems may be eye make-up related, the patient should be questioned as to what brand and type of eye shadow, mascara and eyeliner is being used, how long the same container of cosmetic has been used, or if there has been a recent change in cosmetic brand. All cosmetics used around the eyes should be discontinued for four or more days. If symptoms are relieved and objective signs improve, the patient should either try another brand of cosmetics or discontinue cosmetic wear. Several trials may be needed before a final product is chosen.

When problems do arise, an optometrist should be seen. In order to help solve these problems, the optometrist must take into account both signs and symptoms, since both may be needed to ascertain the scope of the problem, and an analysis of both are needed to arrive at a solution.

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APPENDIX A

HUMAN SUBJECT RELEASE FORM

1. Institution

- A. Title of Project: Cosmetics and Contact Lens Wear
B. Principal Investigators: Amy Postma, Nancy Jones
C. Advisor: Diane Yolton
D. Location: Pacific University College of Optometry, Forest Grove, Oregon
E. Date: 1979

2. Description of Project

This project is designed to study the effects of eye cosmetics on hard contact lens wear. Eye shadow and mascara will be used and their effects on tear film, and nexia and subjective symptoms observed.

3. Description of Risks

There have been some reports of mild irritation, redness and allergic reactions from the application of eye cosmetics. Risks are minimal and careful instruction on application will be given.

4. Description of Benefits

This study will serve to increase the practitioner's knowledge of the effects of cosmetics and contact lens wear so that he may better advise his patient.

5. Compensation and Medical Care

If you are injured in this experiment it is possible that you will not receive compensation or medical care from Pacific University, the experimenters, or any organization associated with the experiment. All reasonable care will be used to prevent injury, however.

6. Alternatives Advantageous to Subjects

Not applicable.

7. Offer to Answer Any Inquiries

The experimenters will be happy to answer any questions that you may have at any time during the course of this study.

8. Freedom to Withdraw

You are free to withdraw your consent and to discontinue participation in this project or activity at any time, without prejudice to you.

I have read and understand the above. I am 18 years of age or over.

Signed: _____ Date: _____

A P P E N D I X B

CONTACTIC SALES LTD.

Registration 1368042

D.R.Whitehead ; P.Hook.

VAT 302215326

The Misses A. Postma & N. Jones,
2701 Main Street, 1
Forest Grove, OR 97116
U.S.A.

5th March 1979.

Dear Miss Postma and Jones,

Thank you for your letter of February 6th.

Basically, my answer to your questions is that being, at this stage, a small company we did not and have not the resources to (a) objectively test our line of products against all other lines (b) provide you with the products you request.

We would be able to sell you products, ex-factory U.K. at a good discount, for your trials.

I enclose a small paper I have just completed; in this I state that products as good as Optique may possibly be found in miscellaneous other ranges of products - we have tried to bring together the relevant factors re contact lenses into one simple range.

We don't yet have a stockist/distributor in North America.

Should you do trials, our advice would be that many contact lens wearers experience no problems with eye cosmetics, so trials here could be rather meaningless. However, many do experience problems and these ladies have more in common with women with 'sensitive eyes' generally than non-suffering contact lens wearers.

Yours sincerely,
CONTACTIC SALES LTD.



D.R. Whitehead
Director

encl.

CONTACTIC SALES LTD.

Registration 1368042

D.R.Whitehead ; P.Hook.

VAT 302215326

CONTACT LENSES AND EYE COSMETICS

by D.R. Whitehead M.A. (Oxon) Director of Optique Eye Care Cosmetics for
Contact Lens Wearers

One technical researcher, evaluating a particular contact lens cleaning system, summarises the main causes of unclean soft contact lenses as "insufficient/incomplete blinking and make-up deposits adhering to the lens". The constituents of tears are another main factor - as a practitioner pointed out that "lenses become dirty in wear but this is mainly caused by natural secretions, or in females by make-up". Dr. M. Tahan categorises the contaminants of daily wear soft contact lenses into three groups "(1) contaminants from the tear fluid (2) environmental contaminants e.g. cosmetics (3) living fungi in a few cases". Dr. Tahan goes on to say that once contamination is there, cleaning programmes are used attacking one or a combination of protein, liquids and calcium deposits, either by attacking the contaminants themselves, or the 'cement' that binds them.

Prevention, however, is better than treatment, and a female contact lens wearer should be instructed into the correct application of eye cosmetics and into the types of products most suitable for her.

It should also be borne in mind that the manifestation of cosmetic debris on a contact lens, though significant, is in many cases less important for the wearer than a whole range of other problems that arise as a result of incompatibilities between the type of cosmetic, the lens and the wearer - problems often not brought to the optician's attention. These problems include (1) grease on lenses (2) itching and irritation (3) swollen eyelids and eye watering or red (4) particles in the eye (5) other discomforts and difficulties. It is true that these problems are sometimes due to other factors, but on the whole the patient can differentiate between problems with the lenses and those arising after the use of make-up. As a result, some wearers forsake most eye make-up; one or two even stop wearing contact lenses; but most take up the middle ground - they sacrifice some of their make-up, have problems, and take out their contact lenses more than they would normally do.

There are several basic tenets regarding the application of eye cosmetics - for instance putting in lenses before applying make-up and removing lenses before cleaning it off. The contact lens is the main eye cosmetic, and other eye cosmetics should have due deference! *This and other advice is given in the Optique patients data sheets.*

It is, however, the type of eye cosmetic used that deserves particular attention. Products where possible, should be water-soluble (rather than solvent-based) for 'lightness', for easy removal at night, and for better lens cleaning - the 'cement' is easier to attack; however, a water soluble eye shadow is generally not possible, to ensure 'non-creasing'. Perfumes must be avoided. All products should be allergy tested; however, 'hypo-allergenic' should not be interpreted as a blanket

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(2)

insurance to cover everyone - there will always be a few who react to anything. Particles sizes should be under one 'micron'. Oil content must be low - hence "Oil in water" rather than "water in oil" formulations should be used. Products should be light - so one avoids, for instance "lash building" mascaras. Formulations with loose particles e.g. powder eye shadows and "over pearlised" products must be avoided. Naturally, the eye make-up remover should be compatible with the mascara and eye shadow.*

There may be individual products suitable for the contact lens wearer in various cosmetic ranges, which the patient might arrive at empirically after much trial and error. The OPTIQUE range endeavours to bring together all the above factors and combinations into one simple range. Ultimately, however, it should be remembered that the recommended products or range must stand as good cosmetics in their own right, not as just answers to technical problems.

*The OPTIQUE range of eye-care cosmetics for contact lens wearers complies with all these requirements; all OPTIQUE products are perfume-free, low in oil content, & have been allergy-tested; pitfalls like loose powders & particles have been avoided; water-based rather than solvent-based formulations have been used, where possible.

APPENDIX C

Eye Cosmetic: Clinique Line
 Glossy Brush-on mascara - all shades
 Order # 6341
 Lab Formula # TL301/3
 Typed 9/28/76

Ingredients: Purified water / beeswax / morpholine stearate /
 carnauba / acrylic-acrylate copolymer /
 methyl paraben / imidazolidinyl urea / propyl
 paraben / PVP / magnesium aluminum silicate /
 iron oxides

Eye Cosmetic: Clinique Line
 Soft Pressed Eye Shadow - all shades
 Code # 6332
 Formula # 5485/2
 Typed: 10/26/78

Ingredients: Talc / isopropyl lanolate / sorbitan sesquiolate /
 zinc stearate / calcium silicate / tocopherol /
 zinc pyrithione / potassium sorbate / also contains
 one or more of the following: bismuth oxychloride
 and mica / iron oxides / ultramarine blue / bronze
 power / chromium hydroxide green / titanium dioxide /
 ultramarine pink / carmine / manganese violet /
 aluminum powder / ferric ferrocyanide / chromium
 oxide green / ultramarine violet / copper powder

Eye Product: Maybelline Eye Shadow

Ingredients: Talc / zinc stearate / methylparaben / propyl-
 paraben. All shades except Vanilla Frost contain:
 mineral oil / beeswax / sorbitan sesquiolate /
 imidazolidinyl urea / lanolin / polysorbate 60 /
 BHA. Vanilla Frost contains: isopropyl isostearate.

Eye Product: Great-Lash Mascara by Maybelline

Ingredients: Water / beeswax / ceresin / shellac / glyceryl
 stearate / triethanolamine / propylene glycol /
 stearic acid / sorbitan sesquiolate / hydrolyzed
 animal protein / methylparaben / quarternium-15 /
 quaternium-22 / simethicone / butylparaben. May
 contain: iron oxides / titanium dioxide / ultra-
 marine blue.

APPENDIX C (cont'd)

Eye Product: Mary Kay Eye Shadow

Ingredients: Common to all shades: talk / peg-85 lanolin / zinc stearate / Peg-24 hydrogenated lanolin / magnesium carbonate / RPG-30 lanolin ether / isopropyl alcohol / SD alcohol 3A / isopropyl lanolate / water / chalk / lanolin oil / methylparaben / propylparaben / zinc oxide / BHA. Color additives to various shades: bismuth oxychloride / mica / iron oxides / chromium oxide greens / titanium dioxide / ultramarine blue / chromium hydroxide green / ultramarine violet.

Eye Product: Mary Kay Mascara

Ingredients: Not available.